WE CLAIM:

1. A method for evaluating a device model for a circuit element, comprising:
supplying a first set of terminal biases associated with the circuit element;
obtaining a first set of model results based on the first set of terminal biases; and
checking for correctness of the first set of model results by determining whether the first set of model results interrelate according to a plurality of rules.

2. The method of claim 1 wherein the first set of model results include a current vector and a charge vector having a plurality of entries, and wherein determining whether the model results interrelate according to the plurality of rules comprises determining whether the sum of the plurality of entries is zero.

3. The method of claim 1 wherein the first set of model results include a charge vector having a plurality of entries, and wherein determining whether the first set of model results interrelate according to the plurality of rules comprises determining whether the sum of the plurality of entries is zero.

4. The method of claim 1 wherein the first set of model results include a conductance matrix having a plurality of rows of entries, and wherein determining whether the first set of model results interrelate according to the plurality of rules comprises determining whether the sum of the entries in each of the plurality of rows of entries is zero.

5. The method of claim 1 wherein the first set of model results include a conductance matrix having a plurality of columns of entries and wherein determining whether the first set of model results interrelate according to the plurality of rules comprises determining whether the sum of the entries in each of the plurality of columns of entries is zero.

6. The method of claim 1 wherein the first set of model results include a capacitance matrix having a plurality of rows of entries, and wherein determining whether the first set of model results interrelate according to the plurality of rules comprises determining whether the sum of the entries in each of the plurality of rows of entries is zero.

7. The method of claim 1 wherein the first set of model results include a capacitance matrix having a plurality of columns of entries, and wherein determining whether the first set

of model results interrelate according to the plurality of rules comprises determining whether the sum of the entries in each of the plurality of columns of entries is zero.

8. The method of claim 1 wherein the first set of model results include a conductance matrix having a plurality of diagonal entries, and wherein determining whether the first set of model results interrelate according to the plurality of rules comprises determining whether each diagonal entry is non-negative.

9. The method of claim 1 wherein the first set of model results include a capacitance matrix having a plurality of diagonal entries, and wherein determining whether the first set of model results interrelate according to the plurality of rules comprises determining whether each diagonal entry is non-negative.

10. The method of claim 1 wherein the first set of model results are stamped into designated positions in matrices associated with equations for simulating the system.

11. The method of claim 1, wherein checking for correctness of the first set of model results further comprises:

supplying a second set of terminal biases that is slightly different from the first set of terminal biases;

obtaining a second set of model results based on the second set of terminal biases; and

checking for correctness of the first set of model results based on differences between the first set of model results and the second set of model results and on differences between the first set of terminal biases and the second set of terminal biases.

12. The method of claim 11 wherein all except one of the second set of terminal biases are equal to respective ones of the first set of terminal biases.

13. A method for simulating a system having a large number of elements interconnected through their terminals, some or all of the elements are modeled by element models each for generating model results describing characteristic of an element under a set of terminal conditions; comprising:

obtaining a first set of model results associated with an element in the system based on a first set of terminal conditions for the element; and

checking for correctness of the first set of model results by determining whether the first set of model results interrelate according to a plurality of rules.

14. The method of claim 13 wherein the model results are stamped into designated entries in matrices associated with a set of matrix equations that simulate the system and the method further comprising:

obtaining solutions for states of the system by solving the set of matrix equations.

15. The method of claim 14, further comprising:

forming a second set of terminal conditions for the element based on the solutions for the states of the system;

obtaining a second set of model results associated with the element based on the second set of terminal conditions for the element; and

checking for correctness of the second set of model results by determining whether the second set of model results interrelate according to the plurality of rules.

16. A computer readable medium storing therein computer readable program instructions that, when executed by a computer, cause the computer to perform a method for evaluating a device model for a circuit element, the computer readable program instructions comprising:

instructions for supplying a first set of terminal biases;

instructions for obtaining a first set of model results based on the first set of terminal biases; and

instructions for checking for correctness of the first set of model results by determining whether the first set of model results interrelate according to a plurality of rules.

17. The computer readable medium of claim 16 wherein the first set of model results include a current vector and a charge vector each having a plurality of entries, and wherein the instructions for determining whether the model results interrelate according to the plurality of rules comprises:

instructions for determining whether the sum of the plurality of entries in the current vector is zero; and

instructions for determining whether the sum of the plurality of entries in the charge vector is zero.

18. The computer readable medium of claim 16 wherein the first set of model results include a conductance matrix and a capacitance matrix each having a plurality of rows of entries and a plurality of columns of entries, and wherein the instructions for determining whether the first set of model results interrelate according to the plurality of rules comprises:

instructions for determining whether the sum of the entries in each of the plurality of rows of entries in the conductance matrix is zero;

instructions for determining whether the sum of the entries in each of the plurality of columns of entries in the conductance matrix is zero;

instructions for determining whether the sum of the entries in each of the plurality of rows of entries in the capacitance matrix is zero;

instructions for determining whether the sum of the entries in each of the plurality of columns of entries in the capacitance matrix is zero;

instructions for determining whether each diagonal entry in the conductance matrix is non-negative; and

instructions for determining whether each diagonal entry in the capacitance matrix is non-negative.

19. The computer readable medium of claim 16, wherein the instructions for checking for correctness of the first set of model results further comprises:

instructions for supplying a second set of terminal biases that is slightly different from the first set of terminal biases;

instructions for obtaining a second set of model results based on the second set of terminal biases; and

instructions for checking for correctness of the first set of model results based on differences between the first set of model results and the second set of model results and on differences between the first set of terminal biases and the second set of terminal biases.

20. The computer readable medium of claim 19 wherein all except one of the second set of terminal biases are equal to respective ones of the first set of terminal biases.